Geological Survey of Newfoundland

PRELIMINARY REPORT ON COAL BORING OPERATIONS

TOGETHER WITH

REPORT
ON
Coal Boring Operations, 1908

By

JAMES P. HOWLEY, F.G.S.

ST. JOHN'S, N.F.
Robinson & Company, Limited, Press
1917

K. J. Simdower S/y

Geological Survey *of* Newfoundland

PRELIMINARY REPORT ON COAL BORING OPERATIONS

TOGETHER WITH

REPORT
ON
Coal Boring Operations, 1908

By
JAMES P. HOWLEY, F.G.S.

ST. JOHN'S, N.F.
Robinson & Company, Limited, Press
1917

PRELIMINARY REPORT ON COAL BORING OPERATIONS, 1908.

Geological Survey Office,
December 29th, 1908.

HON. J. A. CLIFT, K.C.,
Minister of Agriculture and Mines

Sir,—

In accordance with your request, I beg to furnish you with a short preliminary report of the Coal-Boring operations during the past season.

The Government having decided to give the further prosecution of the work out to contract, Mr. J. W. Randall, of White Plains, N.Y., a thoroughly reliable drilling expert, was awarded the same.

As soon as Spring opened, Mr. Randall lost no time in getting the work underway. He was to furnish two powerful machines with all necessary equipment and men to operate them, also to have the use of the small machine, the property of the Government already on the ground.

Early in May he sent forward one drillman with two helpers to start boring with the latter machine, which stood in position over the last hole put down the previous year. They were instructed to continue this hole downwards and make what depth they could pending Mr. Randall's arrival with the larger machines.

At the end of last season this hole had reached a depth of [illegible] feet, which was continued to 287 feet, when it became so hard [illegible] no further progress could be made without reaming and getting [illegible] casing pipe to the bottom. An attempt was made to do this, [illegible] owing to the absence of suitable tools for the purpose in the drill outfit, the hole had to be abandoned after making 31 feet, and the machine moved to a new location some 256 feet further back and nearer our camp.

The details of the bore-hole above-mentioned, together with a section of the rocks passed through were furnished last year. The cores from the 31 additional feet now attained, consisted chiefly of sandstones and shale, all belonging to the true coal measures.

The new position now taken up is referred to as No. 1 hole of this season. It was carried down to a depth of 278 feet, beyond which the small drill was unable to penetrate, owing to the bad character of the ground and the insufficient capacity of the machine.

The section passed through consisted of a surface deposit of sand, gravel and boulders to a depth of 41 feet, succeeded by a great thickness of argillaceous and arenaceous shale with occasional dark carbonaceous bands, and a few layers of kidney ironstone. Here and there thin beds of sandstone occurred, being more frequent towards the bottom of the hole. Many fossil impressions were found in the shales, and at depths of 45 and 116 feet two small coal seams of about four inches respectively were passed through. Some of the more carbonaceous shales also contained thin irregular streaks of coal.

Seeing that this small machine was entirely inadequate to cope with such conditions as prevailed here, Mr. Randall decided to abandon its use and house it in where it stood. In any case, it is now getting pretty well worn out after five years' constant hard usage.

Mr. Randall with the two large machines and the remainder of his crew and outfit arrived on the ground early in June, and immediately commenced operations at two other points I had already located. One of these, called No. 2 hole, is situated alongside of a small rivulet about midway between No. 1 and Goose Brook. The other, No. 3, is close by the latter brook near where the railway spans it.

At both these locations an enormous depth of boulders and coarse gravel was encountered, so much so that after nearly two months' desperate work No. 2 had to be abandoned after reaching a depth of 130 feet without striking the bed rock. It became quite evident that some disturbance, some great break or fault occurred here causing such a depression in the surface of the underlying rock formation. This supposition was borne out afterwards in the broken and slick-ensided condition of the cores taken up in No. 3 hole.

In the meantime, seeing the great difficulty of contending with such a great depth of surface deposit, with the machines in use, Mr. Randall proceeded to the United States to procure another drill of a different type, called the Keystone, better adapted to cope with such conditions.

As soon as he returned with the Keystone drill it was sent down the river side to a point 1130 feet north of No. 3 hole, and a new one, No. 4, started, with a larger 8 inch pipe. This hole was drilled and the pipe driven 80 feet till it was well into the bed rock, then the Keystone was brought back to No. 3 and the core machine there transferred to No. 4 hole.

Previous to this No. 3 had reached 71 feet, but had to be stopped at that depth, being unable to penetrate further.

With the aid of the Keystone this hole was finally put down and the large pipe driven well into the bed rock, which was not reached till a depth of about 118 feet was attained. One of the core drills was now put on this hole, and the Keystone again removed down the river 1583 feet beyond No. 4, where another hole, No. 5 was started.

Nos. 3, 4, and 5 were now continued uninterruptedly till the end of November when the work closed down for the season.

At No. 3 the rocks met with were very much broken and as a consequence it was with the greatest difficulty any progress could be made Constant falling in of the sides of the hole occurred jambing the tools and causing endless trouble in withdrawing them. Very little core was obtained and this consisted of some coarse grit and sandstone with a small portion of arenaceous shale. A few fossils only were seen, and no coal except just at the surface of the bed rock, where several loose fragments were washed up.

No. 4 hole proved to be the most successful and most promising yet put down. It reached a total depth of 541 feet, and judging from the cores obtained indicated that here we had struck a higher portion of the Coal Measures than had hitherto been met with. The section passed through consisted mainly of shale and fine grained sandstones with occasional thin strata of grit and several considerable bands of kidney ironstone. The shales were chiefly of an argillaceous and arenaceous character, but there were also many higher carbonaceous layers. Most of these shales were crowded with carbonized leaves and rootlets, some portions being simply a mass of comminuted plant remains. Both the shales and sandstones at time exhibited good sections of fossil trees, all characteristic of the True Coal Measures. At depths of 32, 111, 124, 184, 220, 302 and 306 feet actual seams of coal showing the following thicknesses were passed through, in their order of succession downwards:

No. 1	Coal	2 ft. 6 in.
No. 2	Coal	1 ft. 0 in.
No. 3	Coal	2 ft. 4 in.
No. 4	Coal	4 in.
No. 5	Coal	1 ft. 0 in.
No. 6	Coal	6 in.
No. 7	Coal	1 ft. 6 in.

All these coals were of good quality, some being exceptionally clean and bright and apparently comparatively free from sulphur or other deleterious substances. The whole section indicates at this point a considerable thickness of Coal Measures proper, and the cores from the bottom are still of such a favourable character as to make it quite clear we have not yet reached the limit of the coal bearing strata. I would therefore strongly urge that this hole be continued beyond the contract limit of 600 ft., or in fact till the bottom of the measures was reached. To do this effectually it would be advisable to start a new hole with a larger sized pipe, as at present the smallest size that can be used with this drill, viz., 4 in., is now down to within a few feet of the bottom, and cannot be carried much further.

No. 5 hole on which the Keystone drill only was worked, reached a depth of 200 feet, through boulders, gravel, sand and clay; the latter indicating sandstones and shales of the usual character. A few layers of dark carbonaceous shale, with some small fragments of coal came up in the wash, but no true coal seam was struck. Still the material washed up left no doubt of the coal measures being here also. It is the intention when the work is resumed next season, to put one of the core drills on this hole, so as to obtain a satisfactory record of the borings.

Other sites for future holes have been located, and there need be no unnecessary delay in prosecuting the work next spring.

The total number of feet bored during the season was as follows:

In last year's hole	31 feet
In No. 1 present season	278 feet
In No. 2 present season	130 feet
In No. 3 present season	188 feet
In No. 4 present season	541 feet
In No. 5 present season	200 feet
Total	1,368 feet

I have the honour to be,

Sir,

Your obedient servant,

JAMES P. HOWLEY.

REPORT

ON

Coal Boring Operations during the Year 1908.

Geological Survey Office,
St. John's, Newfoundland,
March 6th, 1909.

HON. S. D. BLANDFORD,
Minister Agriculture and Mines.

Sir:—

At the conclusion of the boring operations in 1907, the Government having decided to put the further prosecution of the work out to contract, I was requested to communicate with parties in Canada and the United States with a view to ascertaining whether a reliable person could be had to undertake it. The Ingersol Rand Drill Company strongly recommended Mr. J. W. Randall, of White Plains, New York, as one who had had extensive experience and was in every way thoroughly reliable. Mr. Randall was at once communicated with, and, at the desire of the Government, requested to come here to confer with them about the matter. He arrived early last winter, and after making himself familiar with all the conditions surrounding the undertaking, he finally entered into a contract to put down three thousand feet of borings at a certain figure per foot, the holes not to exceed six hundred feet in depth, or to be less than one hundred feet. He was to supply two large powerful drills, besides having the use of the small one owned by the Government, and to find all necessary men and tools to operate the same.

Early in May he sent forward three of his men, who, on their arrival here, proceeded with as little delay as possible to MacGregor. They were to start work with the small drill, pending the arrival of the larger machines, and endeavour to put the hole over which it stood down to a depth of three hundred feet or more. This hole had reached a depth of two hundred and fifty-six feet at the close of the season of 1907. About the middle of May, Mr. Randall himself, with the remainder of his men, and outfit, reached St. John's, and no time was lost in getting all on the ground. Work was well under way by June 1st, and was prosecuted vigorously from then till the end of the season. In a short preliminary report, already furnished the Government, the main facts of the operations were given, and I now have the honor of furnishing the details in full, accompanied by sections of the bore holes, which will aid in fully illustrating the same. When the small drill had attained a depth of two hundred and eighty-seven feet, the hole became so bad that it was found after various attempts that it could not be bored further. It was accordingly abandoned, and the machine moved to a new position close to the pond near MacGregor, where No. 1 hole of this season was commenced. Boring was continued here until September 26th, when a depth of two hundred and seventy-eight feet was attained, which was found to be about the full capacity of this drill in the class of rocks met with here.

In the meantime, the two larger drills were working away at two points further west, one about midway between No. 1 and Goose Brook, the other close by that brook, where the railway bridge spans it. These are called Nos. 2 and 3 holes. Great difficulty was found in getting down at each of these places, owing to the enormous depth of boulders and gravel met with. No. 2 had to be abandoned after reaching a depth of one hundred and thirty feet, without striking the bed rock. It had taken two whole months to penetrate thus far, and as it now became very evident that we had struck a fault or break of some kind, which was the cause of such a deep depression in the surface of the underlying strata, it seemed useless to lose any more time at it.

No. 3 hole, near the bridge, proved equally difficult to get down, but it was, nevertheless, continued till the end of the season. No bed rock was met in this hole, until a depth of one hundred and twenty feet was reached. Then the rock was found to be much broken and slicken-sided, indicating considerable disturbance of the underlying formation.

Seeing the difficult nature of the surface deposits and the inadequacy of the ordinary shot drills to cope successfully with such a depth of boulder debris, Mr. Randall proceeded to the United States about the middle of July to procure a new machine of a different type, called the Keystone, which works with a heavy chopping bit attached to a long cable, on the principle of the jumper drill. He returned with this machine towards the end of August, and having got it together, it was first sent down the river to a point eleven hundred and thirty feet north of No. 3, where a new hole—No. 4—was started.

This machine is fitted with a traction engine, and can be easily moved from place to place, once a way is cleared for it, by removing the fallen timber and other obstructions. It proved very efficacious in coping with the heavy deposits of boulder drift, and in the course of a few days' chopping and driving, reached the bed rock of No. 4. One of the large Calyx drills was now put on this hole, and the Keystone moved back to No. 3. Once the rock formation is reached, the Calyx shot drill is preferable, owing to the cores brought up affording an opportunity of studying the rocks passed through. The Keystone, as may be inferred, chops up everything it encounters, into fine sand and mud, and the nature of the rocks can only be guessed at by the wash from the hole. The Calyx, on the contrary, affords an actual section of the underlying formation, foot by foot, and thus enables us to judge of its character as the hole progresses downwards.

To go back to No. 3 hole. Here the enormous depth of from one hundred and eighteen to one hundred and twenty feet of surface deposit had to be chopped and driven through before any indication of the rock was met with. It was a most difficult task to penetrate this enveloping mantle, composed as it was of granite boulders, large and small, with coarse gravel and sand. It was not until October 8th that the stand pipe finally reached the bottom of this superficial drift.

The second large Calyx was now put on this hole, and the Keystone moved down the river northerly to a distance of one thousand five hundred and eighty-three feet beyond No. 4, where No. 5 hole was commenced. These three holes, viz., Nos. 3, 4 and 5, were now continued without intermission till the end of November, when the work for the season closed down.

The total number of feet bored in all the holes was as follows:

During the month of May........	24 feet
During the month of June.........	95 feet

During the month of July	104 feet
During the month of Aug.	237 feet
During the month of Sept.	305 feet
During the month of Oct.	270 feet
During the month of Nov.	303 feet
	1,338 feet

This does not include thirty-one feet made in the hole, put down in 1907, being exclusive of the contract.

DETAILS OF BORE HOLES.

No. 1 Hole.

	Strata		Coal	
Surface Deposit	41’	0”		
Sand Stone	4’	4”		
Coal			0’	4”
Shale	3”	4”		
Fine Grained Sand Stone	6’	0”		
Shale	19’	0”		
Ironstone	1’	0”		
Shale	9’	0”		
Dark Grit	2’	0”		
Shale	5’	0”		
Ironstone	0’	5”		
Shale	24’	7”		
Coal			0’	4”
Fine and Coarse Sand Stone	4’	8”		
Ironstone	2’	0”		
Coarse Grit	6’	0”		
Arenaceous Shale	39’	9”		
Ironstone	0’	5”		
Fine Grit	1’	7”		
Shale	6’	0”		
Fine and Coarse Grit	1’	3”		
Arenaceous Shale	11’	9”		
Fine Grit	4’	0”		
Coarse Grit	0’	10”		
Fine Grit	6’	2”		

	Strata		Coal	
Fine and Coarse Grit and Shale ...	8'	0"		
Ironstone ...	1'	0"		
Sand Stone and Shale ...	18'	0"		
Shale ...	19'	0"		
Ironstone ...	0'	5"		
Shale ...	11'	7"		
Fine Grit ...	2'	0"		
Coarse and Fine Grit ...	5'	0"		
Coarse Grit ...	5'	0"		
Ironstone ...	1'	0"		
Coarse Grit ...	7'	0"		
Strata ...	277'	4"	0'	8"
Coal ...	0'	8"		
Total ...	278'	0"		

No. 2 Hole.

Boulders and Gravel ...	132'	0"

No. 3 Hole.

Boulders, Gravel and Sand ...	136'	0"
Broken Shale, Sand Stone and Grit ...	52'	0"
Total ...	188'	0"

No. 4 Hole.

	Strata		Coal	
Boulders and Gravel ...	19'	0"		
Sand and Clay with Loose Coal ...	13'	0"		
Coal ...			2'	6"
Clay, Sand and Shale ...	9'	0"		
Carbonaceous Shale ...	2'	6"		
Arenaceous Shale ...	7'	0"		
Arenaceous Shale and Clay ...	58'	0"		
Coal ...			1'	0"
Shale ...	5'	0"		
Arenaceous Shale ...	7'	0"		
Coal ...			2'	4"

Shale	2' 8"	
Arenaceous Shale	5' 0"	
Ironstone	2' 0"	
Carbonaceous Shale	4' 0"	
Carbonaceous and Arenaceous Shale	10' 0"	
Ironstone	3' 0"	
Carbonaceous Shale	7' 0"	
Carbonaceous and Arenaceous Shale	10' 0"	
Argillaceous and Carbonaceous Shale	4' 3"	
Coal		0' 4"
Arenaceous Shale	4' 5"	
Clay and Ironstone	13' 0"	
Clay, Shale and Ironstone	10' 0"	
Ironstone and Shale	8' 0"	
Coal		1' 0"
Carbonaceous Shale	8' 0"	
Carbonaceous Shale and Ironstone	2' 6"	
Arenaceous and Carbonaceous Shale	67' 6"	
Carbonaceous Shale	3' 0"	
Coal		0' 6"
Shale	4' 0"	
Coal		1' 6"
Shale	1' 6"	
Clay	1' 6"	
Carbonaceous Shale with Coal Streaks	3' 9"	
Carbonaceous Shale with Coal Streaks	15' 3"	
Arenaceous Shale and Sand Stone	5' 0"	
Sand Stone and Shale	15' 0"	
Argillaceous Shale	5' 0"	
Arenaceous Shale	10' 0"	
Arenaceous Shale and Fine Sand Stone	25' 0"	
Arenaceous and Carbonaceous Shale	46' 0"	
Arenaceous and Carbonaceous Shale and Sand Stone	54' 0"	
Sand Stone with Thin Coal Streak	2' 0"	
Arenaceous Shale	5' 6"	
Dark Sand Stone	9' 6"	
Arenaceous and Carbonaceous Shale	10' 0"	

Coarse Grit	6' 6"	
Black Carbonaceous Shale	3' 0"	
Black Carbonaceous Shale and Sand Stone	10' 0"	
Coarse Gray Grit	4' 0"	
Strata	530' 10"	9' 2"
Coal	9' 2"	
Total	540' 0"	

No. 5 Hole.

	Strata.	Coal
Boulders, Gravel and Sand	39' 0"	
Coarse Grit	6' 0"	
Broken Shale and Clay Chiefly	155' 0"	
Total	200' 0"	

The seams discovered during the season are nine in number, which, with eight others in 1896-7 and three previous to that date, make twenty seams altogether in this Goose Brook section. They aggregate about twenty-three feet of coal in all. Most of these seams are, however, too small to be taken into consideration, but those which average one foot and upwards are nine in number, as follows:—

No. 1 Seam	2' 6"
No. 2 Seam	3' 4"
No. 3 Seam	1' 6"
No. 6 Seam	2' 8"
No. 12 Seam	2' 6"
No. 13 Seam	1' 0"
No. 14 Seam	2' 4"
No. 16 Seam	1' 0"
No. 18 Seam	1' 6"

Most of the coal contained in these seams is of excellent quality, some of it being of a superior class. There is little room for doubt that the further prosecution of the boring test will reveal the presence of other seams of great or less value, and by the time the three thousand feet of the contract is completed I fully expect several more will be added to the above number.

While few of those seams may be considered at the present time of workable dimensions, yet a time will come when any seam over one foot in thickness, providing the quality be good and the facilities for extracting the coal prove favourable, will be availed of.

In this connection I may mention that they are at present working coal seams in New Brunswick which only average eighteen inches in thickness. During the years 1900-2, these mines produced respectively, 10,000, 17,630, and 18,795 tons of coal. It is calculated that the area occupied by this small coal seam contains 7,563,390 tons. Estimating the Grand Lake coal area in the same manner, thus, sixteen miles in extent by an average width of half a mile, i.e., forty chains, would give total acreage of five thousand, one hundred and twenty, and allowing one thousand, five hundred tons of coal for one foot of thickness per acre, we get as a result for the entire area, 7,680,000, which, multiplied by seventeen feet, the mean average of thickness of all the seams combined, so far discovered in the Grand Lake coal basin, gives a grand total of 130,560,000 tons.

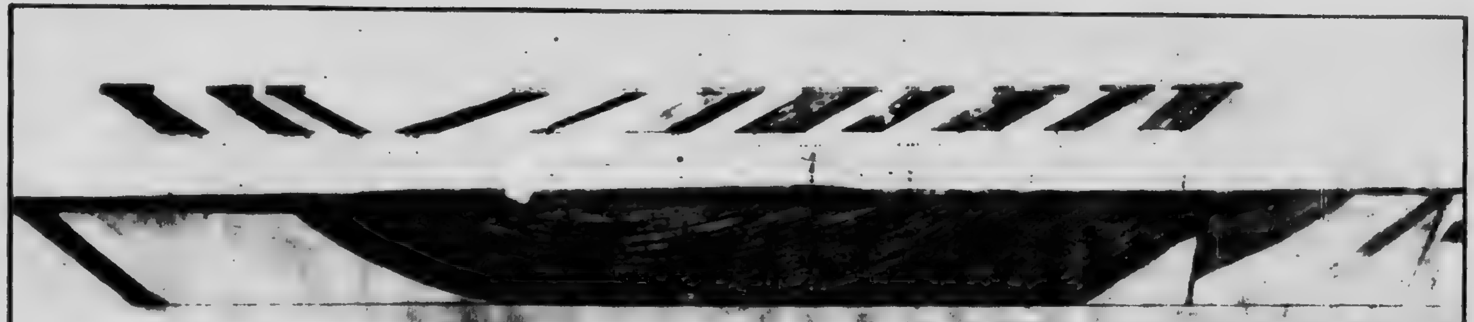
Of course this is altogether an approximation, based upon what is known of this coal field to the present time. Then, again, owing to the smallness and inferior character of many of the seams, it is not probable that more than one-half of this coal can ever be utilized. Even so, we still have the enormous amount of some 65,280,000 tons of coal to rely upon with almost absolute certainty in this central carboniferous area.

I have the honour to be,

Sir,

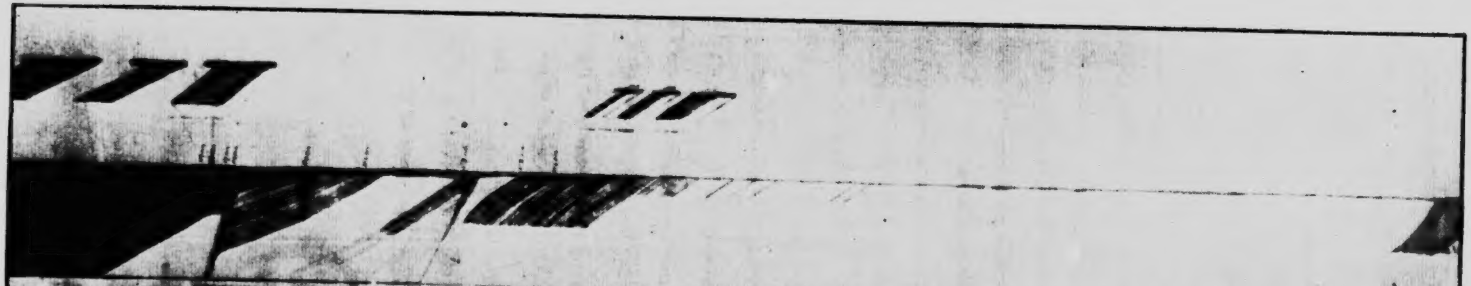
Your obedient servant,

(Sgd.) JAMES P. HOWLEY.



SECTION OF THE COAL MEASURES NEAR COOSE BROOK

[illegible]

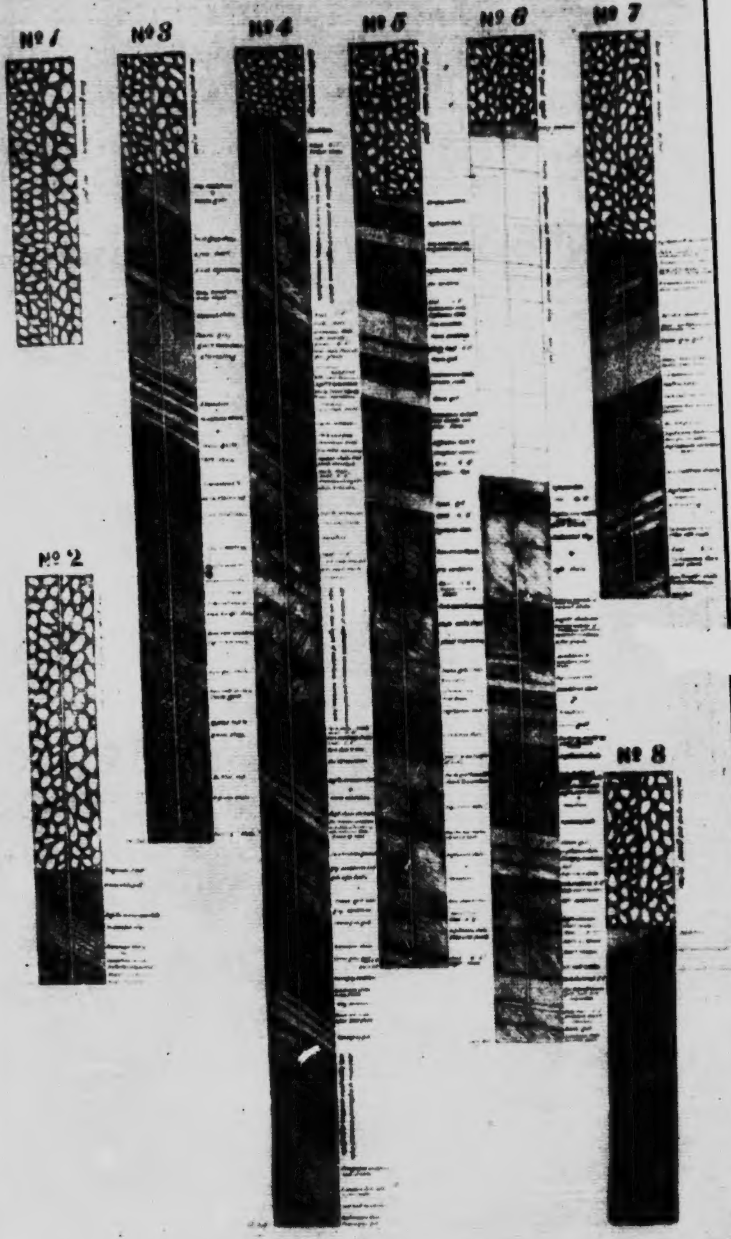


SECTION OF THE COAL MEASURES NEAR GOOSE BROOK AS REVEALED BY THE BORINGS 3.

SECTIONS OF BORE HOLES

NEAR THE GOOSE BROOK

1908 & 1909



SCALE 10 FEET TO ONE [illegible]